Industrial Finishing

An Independent Publication Devoted To The Finishing of Industrial Products

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Spraying	No Rubbing
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The Columbus Varnish Co.
Columbus, Ohio

With the Editor

WHAT IS the excuse for INDUSTRIAL FINISHING's existence? This question was asked by an individual who is authorized to spend a certain quota for advertising finishing materials. When approached by our representative he looked upon INDUSTRIAL FINISHING as simply another place to spend money, and in a moment of resentment he declared that, "of all things manufacturers are not looking for it is more places in which to spend money for advertising."

"Our appropriation has already been stretched to include eight or nine publications and now you come with another." He contended that finishing, being part of the manufacturing process in each of several industries, should be included as a department in existing journals devoted to those industries.

Several months ago Mr. L. N. Graham, able foreman finisher at the Little Rock (Ark.) Furniture Mfg. Co., said to this writer voluntarily and, at the time not knowing he was speaking to INDUSTRIAL FINISHING's editor: "This company, in the past, has subscribed for all the furniture and factory publications that pertained to our line, and I used to read them, but now I am getting a little journal that I get more out of than all the others put together; it's INDUSTRIAL FINISHING."

Foremen finishers and executives are interested in becoming thoroughly informed and keeping abreast of progress in the subject of finishing, which today ranks very high in importance in many industries. Naturally, these men are not satisfied with reading only an occasional finishing article in journals which are manifestly concerned chiefly with other phases of the manufacturing process. Where the editorial matter and advertising space devoted to finishing are dwarfed into insignificance by other features, what is there to hold the attention, command the respect, or excite the admiration of those who are seeking information about finishing?

Reader interest is greatest where there is more to stimulate it, more to hold it and more to satisfy it.

Advertisers of finishing materials and equipment, who complain about having to use so many publications to cover different fields, if they investigate, will find they can reach practically all industrial users, regardless of what the concerns manufacture or what materials they use, through INDUSTRIAL FINISHING.

W. H. Rohr

Managing Editor.

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VARNISHES · ENAMELS · LACQUERS · JAPANS

Layout of Finishing Process

Finisher foreman calls attention to requirements in a satisfactory arrangement of space and equipment in finishing department, and describes a modern layout which incorporates these features

By John H. Steffen

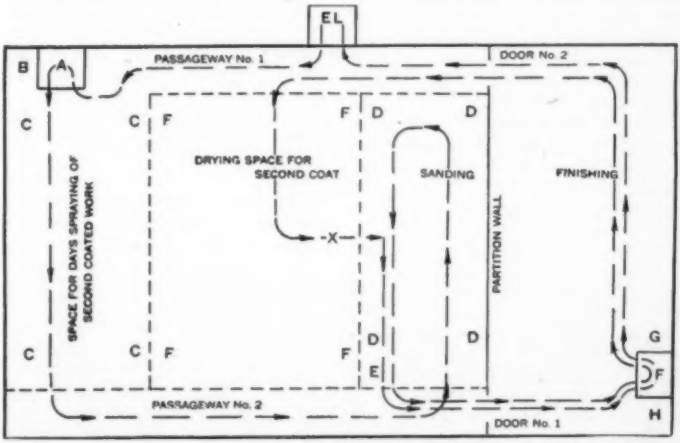
IN PLANNING the arrangement of a modern finishing department, three of the most essential things to take into consideration are, (1) to have ample space, (2) cleanliness and (3) a system of routine. There must be provided ample space in which to place articles in process while the undercoats dry, and enough room should be allowed so workmen will not be crowded. The worker who has plenty of room for his work, and a place to put the finished articles, will do more and better work than the man who works in crowded quarters.

A finishing department should be kept as clean as possible at all times. The presence of dirt and dust causes extra work in sanding; it delays the finish and retards production.

Work Must Move Forward

In every finishing department there should be a system of keeping the work "in routine"—that is progressing from one operation to the next without consuming any unnecessary time in extra handling or moving of the articles.

There should be a place for all materials used, and let everything be kept in its place, so the worker will know just where to find whatever he needs. Passageways should be of adequate width and



Plan of second floor to which furniture comes already stained, filled and dried for application of first, second and third finishing coats.

they should be kept clear and clean at all times, so as not to obstruct the work as it advances from operation to another.

Modern Floor Plan

The accompanying drawing of a floor plan, with arrows to indicate the general course of the work as it passes from one operation to another, represents the layout of a very modern finishing department in an office desk factory. Leaving the cabinet room, the work enters the staining and filling departments which are located on the first floor. There is sufficient space in these departments to place the work for drying purposes, so as not to interfere with space occupied and required by workmen.

Sequence of Operations

When desks are dry they are elevated by elevator *EL* to the third floor and advanced along the passageway No. 1 to spray booth *A*. Here they are sprayed and run into the space marked *CCCC* which is allowed for first coated work. In the space marked *B* near at the spray booth *A*, all materials used at this machine are conveniently placed; a small bench built into the corner is used for the storage of tools, spray guns and containers when they are not in use.

Next morning the first coated work is advanced along passageway No. 2 to the sanding department marked *DDDD* where it is sanded. Then it is cleaned with the air duster at *E* and sent into the finishing room. This room is partitioned off and has two large doors—door No. *1* through which the work goes in to be finished or "second coated," and door No. *2* through which all the work is taken out. Note that the air duster *E*, is placed outside the finishing room and as far as is conveniently possible away from the door that leads into finishing room.

The work is given its second coat of spraying at spray booth *F* and lined up in the finishing room. There is the proper allotment at this sprayer also, for materials used, as marked at *G*. A built-in bench and a lye keg at *H* are conveniently placed to keep all spray equipment clean. Next day the work is run out of door No. *2* into the space allowed for drying of second coated work, see *FFFF*.

Doubling Back to Resand

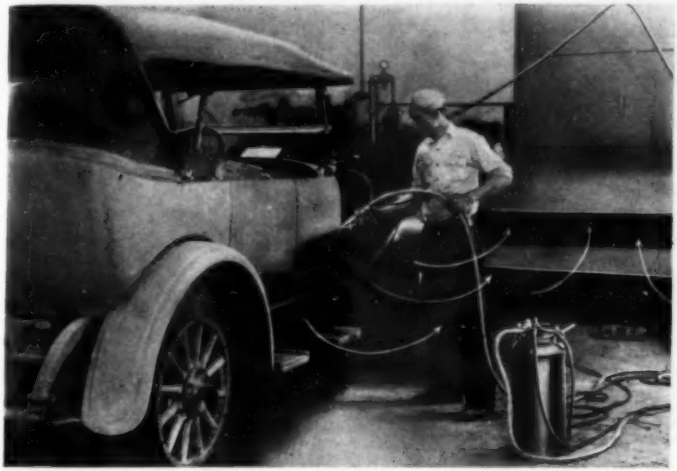
This layout makes the shortest possible distance to run the second coated work, and for the sanders to get it to resand. When the second coat is thoroughly dry the work passes into the sanding room, as shown by arrow *X*, for sanding, after which it is air dusted and sent into the finishing room again for the final coat.

Next morning the work is removed from the finishing room to elevator *EL*, and sent to a drying room for finished work on the second floor. When it is thoroughly dry it is sent to the rubbing department which is also on the second floor.

Following the rubbing operation the desks are sent to the trimmers and then to the inspector who is on the second floor. Then they are taken down the elevator to the packing department on the first floor, where they are carefully packed and made ready for shipment.

Supply House Moves

The Donald Sales and Mfg. Co., Milwaukee, Wisc., announces removal from 232 So. Water St., to 265 So. Water St., where it now has increased office and warehouse facilities. The company carries a complete stock of foundry supplies and electro platers and polishers supplies.



Spraying body of touring car in shop equipped with exhaust system as shown at right.

Automobile Refinishing

Practical finisher describes in detail the entire process of refinishing, from the removal of old finish to the final rubbing of the last high grade varnish or lacquer coats

By R. J. Birnel

THE FIRST operation in refinishing a car from the foundation up is to remove the old finish. This is best done with a liquid paint-remover. Brush on the remover freely and allow it to stand until it has eaten well into the paint; then scrape off the softened paint with a putty knife. Sometimes it is necessary to apply two or three coats of the remover, scraping between the coats.

In many cases it is unwise to go over the whole car at the start; the remover may evaporate and permit the varnish to again become hard. Take one portion at a time and clean it as fast as the finish softens.

Remove Old Finish

Every particle of old finish must be removed, even from the corners and crevices. Scrape the corners clean with a putty knife and wash with gasoline, using a soft rag in this work. A stiff wire brush may be used to remove the finish from inside corners and crevices in metal, and it may be used on wood also if one is careful to make no deep scratches.

Clean the Surface

Both wood and metal must be thoroughly washed with clean gasoline to remove all traces of paint remover. If any rust spots appear these must be sanded out completely. Emery cloth is very good for removing rust.

The priming coat for the new finish should be applied as soon as possible after the old finish has been removed. Do not allow time for rust to begin attacking the iron or steel.

Metal Primer

Metal primer differs from wood primer in that an oxide is used in the former, and lead in the latter. Metal primer can generally be obtained from a paint manufacturer, and I believe it is better to buy it ready-made than to make it. It is a very important material, and the finisher should use the best, as the priming coat is the foundation of the finish. The priming coat may be applied either with a brush or spray.

Lead Glazing

Sheet steel has pores, or "pits" which must be filled. Since many of these pits are too large or too deep for the priming coat to fill, an additional operation—lead glazing—is required to do the work. This glaze is made of white lead ground in a mixture of pure linseed oil, a good grade of japan drier, and turpentine.

Lead glazing, in the consistency of medium thick paint, is applied with a glazing knife; while still soft it is scraped off as clean as possible, using the glazing knife for scraping and leaving the glaze only in the low places. In 24 hours this glaze should be dry enough to sand with moderately fine sandpaper.

All bodies do not need to be glazed all over. Sometimes there are only a few file marks that require filling; these require a heavier putty than is used for glazing, but the putty is applied in the same way.

Lead Paint

When the putty glaze is dry enough to sandpaper to a smooth

Spraying lower portion of sedan in color after upper section has been "greased" to protect its black finish.

finish, it is ready for a coat of lead paint. This coat may be colored with any of the coloring materials used in paints and it should contain just enough oil to prevent it drying with a gloss. Enough drier should be in the material to make it dry in 24 hours in the open shop. The paint should be thinned with turpentine to a free working consistency, and it may be applied either with the brush or spray.

Rough-Stuff

When the coat of lead paint is dry, the job is ready for a coat of rough-stuff which is made in the same way as one would make any quick-drying flat paint, except that no white lead is used in it. Finely-ground silex, or silica, is used as a pigment in this last coat. It is an advantage to have the rough-stuff tinted a color that will be easily covered. For a really fine job two coats of rough-stuff should be applied, leaving 24 hours between coats.

The rough-stuff should be ready for rubbing in 24 to 36 hours

after the last coat has been applied. Some finishers rub it with kerosene and coarse pumice; some use a waterproof sandpaper and water; others use both lump pumice and sandpaper with water. I do not favor kerosene for rubbing because of the difficulty in removing all traces of the oil which, if any remains, will cause peeling of succeeding coats. The oil can be removed by thoroughly washing with gasoline, if every possible care is taken in doing the work.

The coat of rough-stuff should be rubbed down until the lead coat shows through at all the high places, which means that the greater part of the rough-stuff coat is rubbed away. The idea is to put on just enough rough-stuff to stand rubbing to a perfectly smooth finish, with as little of the rough-stuff left on as possible. Rough-stuff is not intended to give body to the finish; its only purpose is to fill the low places, and the less of it left on the surface the better for the finish.

After the rough-stuff has been rubbed it should be allowed to stand for at least five hours to permit evaporation of any moisture which the finishing material may have absorbed; it is then ready to be sandpapered with No. O garnet paper. Any pits caused by particles of the rough-stuff pulling out in the rubbing, are easily seen after the surface has been sandpapered, and when discovered they should be filled with a quick-drying putty.

At this stage of the work we have a surface that is smooth, but in various shades of color caused by rubbing away some of the coats at different places. Now, just as we needed a primer to form a union between the metal and the foundation coats, we also need a primer, or ground coat, for the color and varnish or lacquer coats, as well as to make a surface uniform in color.

The Ground Coat

To make a ground coat for a varnish finish, an approved practice is to mix together the desired coloring material ground in oil (pure linseed oil) and japan in the proportions of nine parts ground in oil and one part ground in japan. The purpose of the oil is to form a union with the hard surface, while that of the japan is to cause drying. This ground coat is a neutral color—one over which any color, such as we see on automobiles, can be applied. If the job is a two-color one, the different colors, ground in japan, are applied.

For a lacquer finish, practically the same method is followed in the ground and color coats as for the varnish finish, except that colors ground in oil only are used. The color should be reduced to a creamy consistency, using pure

Spraying the hood with cup gun.

turpentine as a reducer. It is important to have the colors thin enough to flow on smoothly without brush marks, but not so thin that the binding properties of the oil are destroyed.

Unless ground and color coats are applied with a spray, they should be applied with a fine camel-hair brush, brushing only enough to lay the material on smoothly and prevent sags. If the job is to be in one color only, the ground coat may constitute the color coat by using the proper color material; but if it is a two-color job, either two colors of ground must be used, or additional coats of color must be applied —all depending on the kind and density of the colors used, and the quality of finish to be made.

For Lacquer Finish

For a lacquer finish I have advised against the use of colors ground in japan, because at this stage the finish should be subjected to a mild baking. Lacquer finish differs from varnish in that varnish does not form a perfect union with a hard dry foundation, whereas lacquer will take hold of any foundation made from good finishing materials. In fact, the foundation for lacquer must be hard, as otherwise the lacquer may injure it.

A period of 24 hours in a well ventilated drying room at a temperature not lower than 120-degs.F. and not above 140-degs.F. will make a hard foundation on which to apply the lacquer. I know that some shops use a temperature as high as 175-degs.F. This is all right for speeding up the drying between the various undercoats so that more than one operation can be performed in 24 hours; but for the final drying of undercoats I prefer 24 hours in a temperature not higher than 140-degs.F.

Lacquer, of course, must be applied with a spray, and spraying is a story by itself. However, in order to avoid pitting of the lacquer, the operator must empty the condenser at frequent intervals; otherwise water will get into the airline, and into the lacquer, thus causing pitting.

Colored Lacquer, or Clear

There is a difference of opinion as to whether it is better to use colored or clear lacquer on automobiles. Each has certain advantages. A pigment-colored lacquer is more durable than clear lacquer, since the pigment protects the lacquer from direct rays of the sun. The immediate outer surface is not so protected, but deterioration of the outer surface through contact with direct sun rays and with the elements, is so slow that the friction of repeated washing and polishing removes the deteriorated film and keeps the surface always like new.

Clear lacquer will take a more brilliant polish than the colored article, but this is only while the lacquer remains comparatively new. However, automobile manufacturers are getting away from the high-luster finish and people are accepting "eggshell gloss," or dull-rubbed finish which is easily made with colored lacquer.

Two-Color Jobs

On a two-color job, it is better to coat the top part first. The lower part can be protected with wrapping paper. Later, the top part can be protected in the same way, while the lower part is being finished. The top part may be further protected by coating its lower portion with crude vaseline or some grease which cannot be penetrated by lacquer.

Rubbing For Smoothness

Although it is very smooth, the sprayed lacquer surface is seldom a perfect finish, and it can be improved if each coat is given a slight rub with fine sandpaper or steel wool before the succeeding coat is applied. From three to five coats are usually applied —all depending on the smoothness of the foundation and the quality of finish desired.

When the final coat is dry it is rubbed to a fine finish. Just how the rubbing should be done depends on what is desired. The materials used include pulverized pumice and water, pumice and oil, or one of the several advertised rubbing compounds. Oil rubbing is not recommended on account of the surface being likely to take on a bloom afterward.

Some finishers have had great success with a liquid soap, which can be bought or made by dissolving hard soap in water to the consistency of rubbing oil. The finest pumice must be used, as the soap solution gives increased cutting qualities to the particles. A small quantity of pulverized rottenstone may be added if a slightly brighter finish is desired than the pumice alone will give to the lacquer.

Automotive Maroon Lacquer

So much trouble was experienced in the early days of lacquer finishes with maroons that one large manufacturer went so far as to state that a satisfactory maroon lacquer was impossible. This has held back their use considerably, and is in no way true.

It is possible to obtain maroon lacquer finishes that are just as permanent as anything ever used in the old varnish type. They are higher-priced, it is true, because they are developed from alizarine madder lakes, but it is perfectly possible to obtain them and have them give real satisfaction.

The only drawback with the brilliant maroon pigment today is its lack of covering properties in the deeper shades. The more brilliant, deep maroon pigments are found to lack opacity or covering power, to a marked degree and they may only be used over a suitable groundwork. The solid-covering, light maroon pigments, on the other hand, lack depth of tone and brilliancy.

It may be said in passing, that any ordinary alizarine lake will not do when ground in lacquer. It must be especially well made and developed, or the finished enamel will be decidedly brittle. Also, if the ordinary form of maroon toner is used, there is a distinct action in the can and a precipitation of both color and cotton will result. When carefully selected under competent laboratory experts, however, there is no difficulty in supplying the trade with any ordinary shade of maroon.—From paper read by Chas. A. Green, of Valentine & Co., at annual meeting of S. A. E. in Detroit, last January.

B. J. Robertson Dies

Benjamin J. Robertson, who at the time of his death was vice-president of the Reliance Varnish Co., Louisville, Ky., died April 17, after having been ill several days with bronchial pneumonia. Mr. Robertson was 76 years old.

He is survived by his widow, Mrs. Anna C. Robertson; a daughter, Mrs. Marvin Beard, of Hardinsburg; a son, Benjamin Robertson, Jr., and a brother, Major Joseph L. Robertson, of New York. Funeral services were held Monday afternoon at the residence, followed by burial in Cave Hill cemetery.

Coloring Wood With Dye

The author describes some of the methods and processes of dyeing woods, which he observed and investigated while overseas with the Eighth Division

By George Rice

DYEING wood so the color will hold its original brightness when subjected to the tests of natural and artificial light, moisture, heat, frictional rubbing, bacterilogical action, perspiration of human hands, mildew and other conditions of service, is a somewhat different thing than staining wood. Dyeing implies a more permanent color, although there are some dyestuffs which so loosely fix themselves to the wood fiber that they are quite fugitive when it comes to a test. In dyeing wood the process commonly consists in boiling or otherwise saturating the wood in dye solutions prepared to make the desired color. This is the simplest form of color application to wood. Only certain divisions of the dyes can be applied this way. Some of the dyeing processes have to be conducted in accordance to the properties of the dyes which are used, and others in accordance to the nature of the wood.

Dipping in Cold Bath

In dyeing low grade wood for the manufacture of cheap toys or trimmings, the wood is often dumped into a cold dye bath, made up of inexpensive coloring substances and left immersed for only a short time so that no excessive quantity of the dye will be absorbed into the fiber, where it cannot add much to the commercial value of the wood.

A cold dye will not penetrate well, but with dyestuffs and chemicals rated high, and the market price of wood dyed for toys usually below normal, the colorist can not be blamed for striving to get out a marketable product as economically as possible.

German Methods Scientific

German toymakers used to control the wooden toy market in this country, and even now they send in great consignments of ship models, mechanical toys, children's vehicles, etc. Many of these toys contain a number of pieces of wood which are not hand painted, stained or printed. The pieces are dyed, and each dye and each class of parts is treated according to its individual requirements.

German toy makers operate dyeing departments in which wood dyeing and the imitating of fancy woods are conducted on scientific principles. They have the art so well in hand that they can bring out and beautify the apparently invisible veins and markings of common wood without the use of pigments, and make the wood far more valuable for use in an extensive range of products.

Pine, elm, pear, walnut, fir, ash, beech and maple are available for dyeing colors which are not natural to them, or for enhancing their value by chemical treatment. Some of these dyed products are exported to America.

While the dyers who color cheap woods for toy manufacture (or for decorative purposes where light exposure is not intensive) endeavor to make the dyestuffs go as far as possible by not permitting much of it to penetrate into the tissue of the wood, dyers who furnish colored woods for the more staple purposes seek opposite results.

Elaborate Equipment Used

It is possible to get a color on wood by merely dipping it into a dye bath. But some of the foreign dyers of wood have installed elaborate equipment in which the wood to be treated passes through much more than a dipping process. Several of these plants I visited while on duty over seas. One near Brest, France, is equipped with a boiler to which a cylinder is attached for receiving the wood to be colored.

The cylinder is partly filled with the dye solution and after the wood is put in, the lid fastened down. The air is exhausted from the cylinder and the external pressure from the boiler forces the dye into the wood fiber. Most of the wood dyeing outfits are operated on a similar plan. The wood for dyeing is enclosed in airtight cylinders or boxes and the air pumped out, so that the dye can be driven into the wood under a pressure of 30 or more atmospheres, according to the physical character of the wood and the chemical nature of the dye solution.

Vacuum and Pressure Process

In one typical installation where a boiler and tank are in service for dyeing, the blocks of wood, averaging an inch in thickness, are placed in the boiler and steamed until the sap is extracted. Complete removal of the sap is determined by the appearance of the condensed water, which will not run clear unless all of the sap has been eliminated.

Then the air pump is started and air is exhausted from the boiler. The dye solution which has been previously prepared is run in from the dye tank. Pressure of the external atmosphere causes the dye liquor to penetrate the wood and as a result the coloring is effective. Some woods have to be thoroughly dried before dyeing so as to open the pores and assist in the elimination of the sap.

The same boiler which is used for dyeing can also be used for drying the wood before dyeing by employing a temperature of about 110 deg. F. The depth of the dye penetration depends upon the character of the wood and the use to which it is put.

Depths of Penetration

Some woods intended for furniture, mouldings, picture frames, and similar purposes need a penetration of ⅛ to ¼-in., or even more to assure lasting qualities. For the toy market the usual surface penetration is practically nil, as only the exterior needs a coating of the color.

Sometimes the dyeing is prolonged and the dyestuff caused to impregnate deeply for the purpose of heightening the tone of the color. Much depends upon the efficiency of the vacuum created in the steam chest to empty the wood cells so that the dye can be sucked up without hinderance. A weak or defective air exhaust will not perform its work well and as a result one may expect uneven or otherwise faulty dyeing.

Sometimes an air pump fails to perform to its full rated ca-

pacity, and unless instruments are used to ascertain the precise degree of exhaustion of the air from the dye chamber, the dyer is liable to turn out considerable poorly dyed material before the faulty condition of the colored wood is noticed and the cause corrected.

Combination Filler-Stain

It is not considered the best finishing practice to employ a material which will stain and fill the wood in one operation, especially on high-grade work such as pianos, although it is sometimes done on radio cabinets and popular priced furniture.

In general, combination fillers are made along the same general lines as paste wood fillers except that sufficient coloring matter is incorporated to allow the filler to stain the wood between the pores before it is wiped off, at the same time that it fills the pores of the wood.

Applying a combination stain-filler with brush.

This result is much easier to obtain on oak and light colored finishes, than on mahogany and walnut, although it is also possible to get the same effect on these two woods.

Great care must be taken in the manufacture of such a product, however, for use under lacquer, to see that the coloring matter used is not of a type that will be readily dissolved by the solvents in the lacquer film and bled up to succeeding coats of finishing material.

Oil stain, as a rule, will not work satisfactorily under lacquer, and the filler must be so designed as not to be readily softened, nor the color bled out of it, by the lacquer solvents. Otherwise the pores of the wood are likely to show up gray.—T. M. Evans.

Dabolt Leaves Zapon

Mr. Newton E. Dabolt, who for the past six years has been General Sales Manager in charge of sales for both the Lacquer and Leather Cloth Divisions of the Zapon Co., has announced his resignation effective April 1st.

While he has not definitely announced his future plans, Mr. Dabolt is severing his twelve-year connection in order that he may give personal business interests in Rochester, N. Y., his undivided attention.

Wood Lacquers

That give a finish that lasts. We are pioneers in making dependable lacquers since 1857. Send requirements, get our prices.

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FOR WOOD STAINING
All Shades
Water - Oil - Spirit Soluble

Write your requirements to

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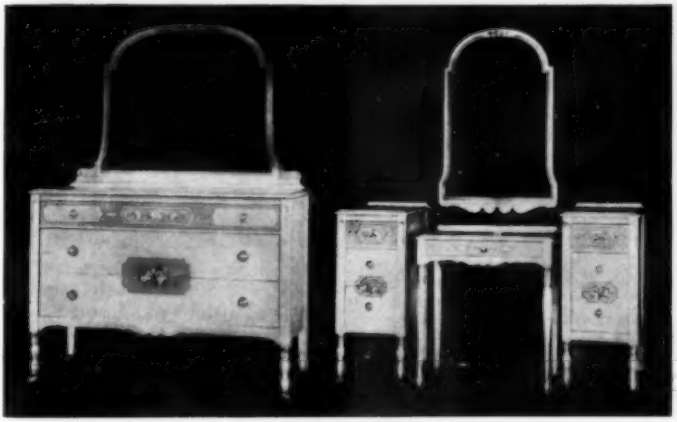
314 W. 14th St., New York



Furniture by The H. Lauter Co., Indianapolis, finished in decorated enamel.

Finishing Furniture in Colors—I

First installment of a two-part article which contains much information on color pigments and color mixing that is of timely interest and value to many furniture finishers.

By A. Ashmun Kelly

THE PRESENT fashion of finishing so much furniture in colors finds many finishers unprepared to execute the work, in as much as they have been long accustomed to using filler, stain, varnish and more recently lacquer. Paint is something out of the usual line with them.

Problems come up as, how to mix colors to get the various shades, tints, etc., and what colors harmonize best with one another. Manufacturers are called upon to match colors submitted either by sample or by description, and it is not always easy to do.

The practice with some finishers is to start with white undercoating and add colors that will produce say grays, and other pure, light effects.

Different Blues

First of all is it important to know the tinting properties of colors, or pigments, more correctly speaking. We all know how blue, for instance, will tinge white to a pale blue, but it is not so generally known that the two blue pigments in general use—Prussian and ultramarine—give different tints. Both are chemically prepared colors, and under the head of "Prussian blue" are included all similarly made blues, such as Chinese, Antwerp, etc. All these analyze the same, but when used for tinting, they do not produce the same effects.

Prussian blue gives with white a light blue tint, but this tint is slightly purplish and grayish. Chinese and the other blues of this order give a clearer and truer blue tint.

Ultramarine blue contains sulphur, due to one of the constituent substances used in making it, hence it is not safe to use with white lead, but as zinc white is neutral, it does well with it.

Yellow, Vermillion, Black

Chrome yellow may be had in at least four tones, namely, lemon or light, medium, dark, and orange. Being a lead-base pigment (lead chromate) it does not do well in connection with sulphur pigments, such as ultramarine blue. Use Prussian blue instead.

Vermillion, when pure, or when made from the Chinese or English, etc., formula, contains sulphur, hence will not do well with lead pigments.

Of the blacks the drop and lamp blacks are most commonly used. The two produce differing shades. Even drop black will make different shades; the pigment prepared from ivory (which it seldom is) being mostly made from bone, by calcination, giving a softer grayish shade than that from lampblack. Lampblack gives a cold, grayish shade. For a quiet gray shade add a little burnt umber to the mixture.

White as a Base

Of the whites used, the chief one will probably be zinc white (or more correctly zinc oxide) because it is a neutral base for any coloring desired, and gives a hard foundation. But as to the foundation coats, the manufacturer of furniture may use his own judgment, being governed by cost of material. It is not necessary to use quite as durable a pigment as is commonly employed in structural or house painting. There are compound-base paints that do very well, and some of which are employed in house painting.

What you need to do is to get a solid, even surface for the finish, over which varnish is to be spread. Hence, the last coat at least must be flat, or without any oil in its composition.

Such a foundation might be made with lead sulphate, which is not affected by sulphur gas, and which is also non-poisonous. About ten percent of zinc is left in the sulphate, since it cannot be removed. However, it is as costly as white lead, and needs some whiting to make it work easier under the brush. In any case the amount of foundation paint required for furniture painting is slight, and hence not costly.

Color Values

If given a sample of what is desired in the way of coloring the furniture painter will find it easy enough, provided he understands color values. Otherwise the task will be more or less difficult. It is advised in such case to take of the main coloring agents (for the unusual pigments will hardly ever be considered), and form tints and shades with white lead or zinc white. In this way the finisher will see what each pigment can do in the staining of white. Where a solid color is required, he can test each pigment by mixing it with oil and applying it to a prepared surface.

Yellow tints may be made with chrome yellow, and less clear ones with raw sienna and French yellow ochre. Both the latter pigments are simply clay colored with natural, iron-ore pigment,

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which exists in rather larger quantity in the sienna than in the ocre. Burnt sienna is a deeper reddish tone through having been calcined. So likewise umber is calcined to produce the rich brown tone of burnt umber.

When you have to mix some paint to get a certain tint, mix in the lightest color first, then mix in the darker one, and so on. For tinting use only the best materials made. You will not get very satisfactory results with cheaper colors. (*To be continued.*)

Moisture Resistance Tests

The length of each strip of wood in the group pictured herewith, is a measure of the moisture resistance of the coating applied to it. Fifteen principal types of wood finishes are represented in the panel, which shows the results of tests made by the U. S. Forest Products Laboratory at Madison, Wisconsin.

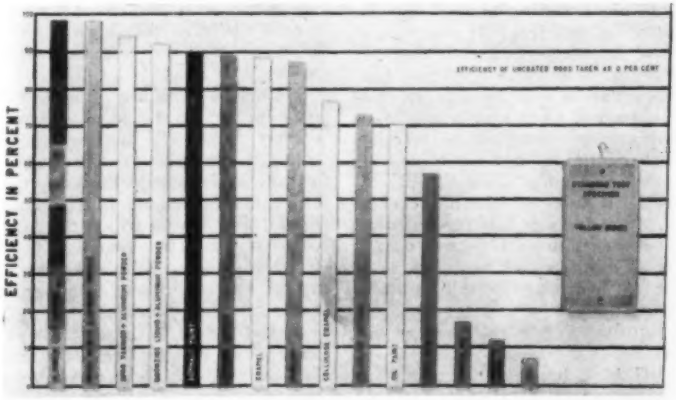
The coating samples tested were representative of grades available in the average paint store. Test pieces completely covered with the various coatings were kept in a very damp atmosphere for 14 days. The relative efficiency of the coatings was determined by the amount of moisture excluded by each, as compared with the total amount absorbed by an uncoated piece of the same size.

This test was not intended to show the weathering properties of the finishing material but merely to show its ability, when new, to prevent moisture changes in the wood.—Photograph by Forest Products Laboratory, U. S. Forest Service.

Binks Opens N. Y. Office

Mr. M. Sullivan, who for years has held an executive position in the home office of the Binks Spray Equipment Co., Chicago, will take over the reins of management at the newly established office in New York City.

This office, under Mr. Sullivan's direction, will offer many new advantages for the greater distribution of paints, varnishes, lacquers and like painting and finishing materials as well as spray equipment.



Moisture resistance of different coatings in percentages, as shown by tests.

Automotive Finishes—Lacquer

Excerpts from part of paper read at the Annual Meeting of Federation of Production Clubs, by Technical Director of Pratt & Lambert, Inc.

By W. R. Fuller

THERE is no need to repeat here the familiar story of how the newer applications of lacquer were all made possible by the development of low viscosity "cottons," which produce lacquers that have a higher solid content and hence give more substance or "body" on the work. This new principle was first embodied in clear furniture lacquer, but quickly extended to pigmented lacquer for automobile finishing. It is for the latter purpose that it has met with the most conspicuous, not to say spectacular success.

Lacquer Field Broadens

So far as the automobile manufacturers are concerned, lacquer has largely replaced varnish for cheap and medium-priced cars and indications are that this process will continue until lacquer and black baking enamel are the only finishes left. If we wish to look far enough ahead, we may even question whether black baking enamel will be able to hold its ground when high gloss, black dipping or flow-coating lacquers are available, and this seems a not improbable development. It is a question of whether the air drying feature of lacquer will counterbalance its higher cost.

To date lacquer has made little or no headway with high-priced cars, due to the willingness of the manufacturer to go to almost any expense to secure a finish of maximum depth and beauty. Because of the excellent care such cars receive and the readiness of the owners to refinish whenever necessary, the durability of the finish is a minor consideration.

Standard Finish, Eventually

It does not follow, however, that the same reasoning will be a good one, three or five years from now. Why assume that because lacquer has not yet approximated varnish in body and gloss, it will never do so? Why assume that owners of fine cars will always hold the same standard as today as to what constitutes a good finish? Why assume that the builders of these cars will always be indifferent to economics of space, equipment, time and labor?

Plainly the situation is full of uncertainties and permits of more than one point of view. My view is that eventually lacquer will be the standard finish, used by the manufacturer on high-priced cars, as well as less expensive makes.

Before proceeding further it may be well to define one of our terms: What is a lacquer finish? For the purpose of this paper, any finish in which the final coat or coats are lacquer is a lacquer finish; any job on which the final coat or coats are varnish is a varnish finish. This, it seems to me, is the only clear cut, logical basis of distinction.

It is illogical to think of a varnish job as lacquer because it has lacquer undercoats, as it would be to call a lacquer job varnish because it has varnish undercoats.

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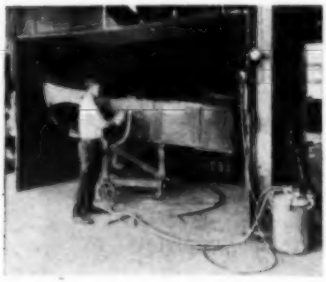
Unsuited For Amateurs

The refinishing of old cars by paint shops and owners is a separate problem and should be treated as such. The use of lacquer by the owner or amateur is so remote that we need give it no attention. For obvious reasons, his preference is oil or varnish base enamel and is likely to remain so for an indefinite period.



Spraying a touring-car body. Notice the portable support which can be run on and off turntable even with floor.

In the custom paint shops perhaps 25 per cent of the work is lacquer, the remainder being divided between varnish and oil enamel. Broadly speaking, lacquer has not met with the same measure of success in the small shops that it has in large factories.

Many of the shops that are using lacquer find their costs higher than with varnish and profits very unsatisfactory, and they continue with lacquer solely because part of their trade demands it. A few shops have even given lacquer a trial and abandoned it. On the other hand, there are a considerable number of shops that seem well satisfied.

Reasonable Explanation

While in explanation we could advance a number of causes, upon analysis they reduce to only two: In the first place, lacquer, in its early forms at least, was not altogether adapted to the practical conditions and requirements of custom shop work; in the second place, the custom painter, because of his inadequate equipment, inexperience with lacquer and lack of knowledge regarding it, was unable to realize its full possibilities.

Both of these causes are the kind that time will remedy or mitigate. We may reasonably look forward to a slow but steady growth in the use of lacquer at the expense of varnish.

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Joins John S. King Co.

Mr. Walter E. Brown has joined the staff of The John S. King Co., Inc., as Production Secretary. Mr. Brown was formerly Assistant Advertising Manager of the Billings-Chapin Co., paint manufacturers, of Cleveland.

New Managers Appointed

S. F. Bowser & Co., Inc., manufacturer of tanks, pumps, and other devices for the economical and safe handling of industrial liquids, with headquarters at Fort Wayne, Ind., has appointed three new District Managers:

Mr. E. W. Cline, newly designated District Manager at Baltimore, Md., 311 Mt. Royal Ave., East, was, until recently, District Manager at Washington, D. C.

Mr. E. Steinhauser, formerly a salesman, has been assigned to the District Managership of Cincinnati, Ohio, Room 14, Blymyer Bldg.

Mr. Geo. C. Gray, another salesman of ability, has been advanced as District Manager of the newly created office at New Orleans, La., 822 Poydras St.

"Only two things are necessary to the highest form of success in a manufacturing business. One is the 'know how' and the other is the determination to make it as good as it can be made. I might call this the skill and the will. Not all good finishes are made by the Murphy Varnish Company, but all finishes made by the Murphy Varnish Company are good."

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Just as for more than sixty years Murphy Varnishes have established and maintained an enviable reputation for quality, so are our newer pyroxylin finishes building similar reputations of their own. Here they are:

MURPHY KAURIOL WOOD PREPARATION is a combination filler, stain and waterproofing material which saves several finishing operations, and forms a perfect base for finishing coats of lacquer, shellac or wax. Sixteen standard colors.

MURPHY FLAT SPRAYING LACQUER is a finishing coat used to reproduce a satin-like rubbed effect without the usual rubbing operation. It will not wear glossy.

MURPHY BRUSHING LACQUER, clear or colored, is a lacquer which really may be applied successfully with a brush.

MURPHY BRUSHING LACQUER WHITE UNDERCOATING is a heavily pigmented, quick drying undercoat for white, ivory, or gray.

MURPHY CLEAR SPRAYING LACQUER has all of the remarkable qualities of lacquer and may be rubbed and polished to give a varnish effect.

Let us send a demonstrator to work out with you how these new finishes can save you money in your finishing plant.

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QUICK DRYING Finishes

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Finishing Metal Toys

Describing English methods employed in the finishing of three grades of sheet metal toys which are colored solid, striped and baked.

By A. E. Tracy, London

HAVING had considerable experience finishing metal toys, I feel prompted to submit a few practical and economical methods of finishing same. At one plant where I organized the finishing of metal toys, we manufactured three grades of toys—best quality, medium and cheap.

High Quality Finish

The best quality toys were finished in high gloss, showing all details and decorative effects. Take motor cars for instance: The best grade toys were made from black plate. By black plate I mean untrimmed sheet iron of a little more than paper thickness.

The black plate is obtained in sheets of roughly 24x30-in. These sheets are first cleaned with silver sand to remove any grease or dirt. They are then sent to the printing shop, and the design, in various suitable colors, is printed on the sheets.

By the design, I mean the decorative design of paneling, striping, outlined foot boards, radiator, etc. These parts are printed on the plate as they appear in the flat sheet, before the body is formed to shape. Depending on size of body, we may get a dozen body designs on one sheet.

After printing is completed the sheets are varnished with "stoving" copal varnish by the varnish roller method I described in a former article in this magazine. When dry, these sheets are ready to be cut up body size on the "guillotine." Windows, doors, etc., are blanked out on the press; then the bodies are formed into shape. The clockwork, and wheels are now forced on. The wheels are black stove enameled by the dipping and whizzing process.

Medium Quality Finish

The second-class finish toys are made from black plate and formed completely with the exception of wheels before any finishing material is applied. They are then carefully sprayed by girls, all over with "stoving" enamel.

I found that bright red or green were most suitable, as they covered well with one coat and were a good color for black striping. We found this enamel very economical, as we were able to thin it about one to six with paraffin oil, which is much cheaper than white spirits, and also get a full gloss finish with one coat. After this sprayed coat was "stoved" (baked) for four hours at 200 degrees F., it was dry. Then we had girls with small pencil brushes, roughly line out the design of panels, doors, etc., in black stove enamel. This was "stoved." When dry, the wheels, which were finished black by the dipping and whirling process, were then fixed.

The Cheap Finish

The cheap grade finish is applied by dipping the top, as completely assembled with wheels. Same is now dipped bodily in stoving enamel, thinned to the right consistency, placed on drain-

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ZAPON

The pioneer lacquer finish

ing rack, then stoved for three hours at 200 degrees F. We found gray the best color for this cheap article, as it does not show any marks so plainly when dry. Girls brush around the outsides of wheels with black stove enamel. Articles are then stoved dry, after which the clockwork is fixed and the articles are ready for the packer.

Wax Finish on a Yacht

Since ordinary commercial or English wax is easily spotted by water in any form, it is up to the finisher of yachts to look for something less susceptible to water. A wax-like finish can be easily produced with the clear nitro-cellulose lacquers which are now so generally used in the furniture industry. Usually the wood is not filled as thoroughly as if a built-up finish is to be produced, and clear coats of lacquer are applied. Oftentimes, one or two coats of lacquer directly over the bare wood will suffice.

This lacquer naturally dries with a luster less than full gloss, and where the pores of the wood are not filled flush, it very closely resembles a wax finish. It has the advantage of being absolutely waterproof and will not spot from rain or salt water.

There are also now on the market flat drying lacquers which very closely resemble a wax finish and which can be used on built-up work; that is, where the pores of the wood are filled flush and two or more coats of heavy-bodied clear lacquer are used under the flat lacquer to build up a varnish-like surface. The flat lacquer is then applied and dries out to a velvet luster resembling a waxed finish.

These lacquer materials in the main are designed for application by spraying. They are not suitable for brushing, although most of them can be brushed on small objects with a little practice and care.

There are also clear brushing lacquers on the market which are waterproof, but most of these dry with a higher luster than that of a wax finish and would have to be dulled down somewhat after being dried, with pumice stone and oil, fine steel wool or some similar abrasive.—C. J. Ballinger.

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Northwest Distributor

J. A. Meyer, who for the past year had charge of the Zapon Department of Harold A. Larsen, Inc., Minneapolis, bought the business from the Larsen Co. on April first, and incorporated Zapon Distributing Co., Inc., 720 So. 4th St., Minneapolis.

The new company is the Northwest distributor of Zapon lacquers and enamels, and also has the distribution for Aloka paint removers, Century paint removers, Protect-O-Lac, Tirro Tape, and other allied products including spray equipment.

They are marketing a new auto enamel, for spray and brush work, under the name of "Za Me Lac," which is out in ten pleasing colors and black and white.

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Finishes—Inlaid, Mottled, Natural

Calling attention to the value of modern bleaching lacquer for use in producing inlaid effects, mottled and light natural wood finishes

By R. L. Masterson

IN MARCH, 1926, issue of this magazine there appeared an article entitled, "Imitating Inlaid Furniture", in which a writer advocated the use of shellac in protecting certain portions of the work during the staining operation, to prevent the stain from taking, on such parts, and thus to bring out the two-toned or imitation inlay effect. This method has been in use for many years and gives quite satisfactory results, but with the perfection of lacquer finishing materials there is now an alternate method which is even better suited for certain types of work.

Use Bleaching Lacquer

It has been found possible, after much experimental work, to combine a bleaching or lightening action on the wood and a scaling action, to prevent the absorption of stain or oil from the filler, all in one product. Such a material is known as a bleaching lacquer. The bleaching agent in the lacquer unifies and lightens the color of the wood and the lacquer solution itself serves the same relative purpose as the shellac solution mentioned in the March article, in that it seals the wood and prevents the stain from penetrating on those parts where it is applied, and also prevents oil (from the filler or varnish) from penetrating the wood and darkening it.

Bleaching lacquer contains no water; consequently it does not raise the grain of the wood to such an extent as a shellac solution, which always contains at least a small amount of water in combination with the alcohol used for cutting shellac. Yet this bleaching lacquer will stiffen such fibers or fuzz that may be present on the work so that a light sanding gives a good smooth surface in much the same way as a thin wash coat of shellac.

An Artist's Work

In using bleaching lacquer to produce imitation inlay effects the parts of the work which are to remain light are coated with the bleaching lacquer, either by brushing or spraying directly on the bare wood. For fine lines, floral effects, monograms, and such decorations, it is better to apply the bleaching lacquer with a small brush or striping pencil, much in the same way that stripes or other decorations would be applied with oil colors on finished work, so as to get cleancut and straight edges to the designs.

It requires some practice to efficiently do such work, just as practice is needed to become a good artist or decorator, but the novice can quickly get the knack of it if he selects designs that are not too complicated. Often the preliminary outline of the design can be drawn on the bare wood with a pencil, using a rule or straight edge to aid in getting

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TO ESTABLISH THE VALUE of this finish for your line we shall gladly finish samples for you at Waukegan or make a complete demonstration at your plant.

(*BREVOLITE* Wood lacquers and lacquer enamels meet the demand of the wood finishing trade for filling qualities and durability—samples on request.)

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the lines straight. Then the design can be filled in with the bleaching lacquer. The pencil lines do not need to be removed as they will aid in producing a clean-cut design.

Masking and Spraying

In production work, where the design is not too intricate or where the hand method would be too slow and expensive, a mask or template can be made of paper or thin sheet metal to permit certain parts to be coated with the bleaching lacquer by spraying and to protect the other parts which are to appear dark after finishing. By working out proper designs, some very pleasing imitation inlay or two-tone work can be produced by this method which is well suited for panels, drawer fronts, doors, tops and other parts of furniture.

Follow-up Operations

Whether the bleaching lacquer is applied by brushing or spraying, it should be allowed to dry about five hours and then sanded lightly. The stain can be applied then over the entire surface in the regular way, without regard to the inlay design, inasmuch as the lacquer coated parts will not absorb stain. After the stain is dry the finishing operations can proceed in the regular way, using either varnish or lacquer.

On certain kinds of wood, or where certain shades are desired, it is possible to entirely eliminate the staining operation and follow the bleaching coat with the filler coat over the entire surface. The oil from the filler and a small amount of the coloring matter will penetrate the wood and darken it where the lacquer has not been applied, but will have little effect upon the parts coated with bleaching lacquer.

Sponging to Mottle

Another very novel effect can be produced with bleaching lacquer by sponging the lacquer on the bare wood so as to cover the wood only in irregular spots. A sponge with fine flakes or pores should be used for this purpose, moistening it with the bleaching lacquer and touching it lightly to the wood so as not to entirely cover the surface with lacquer.

The grain of the sponge will be left on the wood by the bleaching lacquer and when finished with stain, filler, varnish or lacquer in the regular way, a pleasing mottled effect will be obtained. This finish is suitable for panels, drawer fronts, borders and similar parts of furniture.

Light "Natural" Finishes

This bleaching lacquer can also be used to good advantage in producing light colored, natural wood finishes, such as French Hugenot or Bleached Walnut, as it eliminates the necessity of first bleaching the wood, and then wash-coating with shellac before the filling operation. In such cases it is applied by brushing or spraying over the entire surface, directly on the bare wood. When dry it can be sanded lightly, the work filled and the finishing coats applied in the regular way.

Other Bleaching Agents

In producing these light colored finishes it was formerly the custom to first use on the bare wood a bleaching solution, made of potassium permanganate, sodium bi-sulphite, sodium hyposulphite, hydrogen peroxide, oxalic acid or similar bleaching agents. Such solutions raise the grain of the wood, due to the large amount of water

present, and in some cases may cause the finish to "rot" or to go brittle after a period of time, if all the bleaching agent is not removed after it has performed its work. Bleaching lacquer acts as a bleaching agent, color unifier, sealer and first coater all at the same time.

Due to the composition of bleaching lacquers they should not remain in contact with metals over long periods of time on account of the possibility of their becoming darkened in color. It is better to have the material shipped and stored in glass containers.

Liquid Aluminum Bronze

Although it is possible to obtain liquid aluminum bronze from a few of the paint, varnish, and lacquer manufacturing houses, I believe that it has been proved time and again that the most satisfactory results are obtained by mixing the aluminum bronze powder with the bronzing liquid only a short time before applying the bronze paint.

This is for the reason that aluminum bronze powders frequently react with either varnish or lacquer bronzing liquids so that the bronze powder loses its luster and is slightly darkened. Also, sometimes this action is so severe that the solution containing the aluminum bronze jellies up and becomes quite thick.

It is a much safer practice, I think, to purchase the bronzing liquid from a paint, varnish or lacquer manufacturer and the bronze powders from bronze powder manufacturers or other sources of supply, then mix the two together as the work is done, mixing only enough at one time to do one day's work. In this way you will always have fresh material that will give the brightest color and the greatest luster.

There are bronzing liquids made on a varnish base, to be either air dried or baked, and some of these will stand quite high temperatures for a long length of time, such as for coating the insides of ovens and gas ranges, etc. Lacquer bronzing liquids should not be baked, but should always be air dried, and they will not withstand temperatures in excess of about 150-degs. F. for length of time.—R. C. E.

Stood Acid Test

Some time ago when brushing lacquer first came out, I used it as a finish on some black iron pans to be used in a photographer's developing room. Through accident an acid solution fluid was left in the pans over night. Next morning when the pans were cleaned the lacquer finish was as good as ever. The acid had no effect whatever on the white lacquer finish.—A. F. Eibell.

Lucas Branch at Buffalo

John Lucas & Co., Inc., paint and varnish makers since 1849, have opened a branch in Buffalo, N. Y., located at 80 West Chippewa St.

Mr. Edward S. Jordan, an experienced paint and varnish man is Manager of this branch.

The local business in the City of Buffalo, and the business in the territory immediately surrounding that point, will be thoroughly looked after by a sales organization traveling out from the Buffalo office.

No. 82 WATER WHITE LACQUER

For GOLD
For SILVER
For BRASS

A quality lacquer that means economy. We have made good lacquers since 1857. Write us.

Chas. Cooper & Co.
90 Worth St., New York
Works—Newark, N. J.

Industrial Finishing

PRACTICAL PUBLICATIONS, Inc.
Publishers
Room 603, 222 E. Ohio St.
Indianapolis, Ind.

Issued monthly. Distributed exclusively to executives and foremen finishers in all kinds of industrial plants where finish coats are applied.

MAY, 1926

Finish Designer, or Industrial Colorist

The introduction of so many new kinds of finishing materials, the development of improved equipment and methods for applying them, the recognized beauty and increased use of colors in various tints, shades and combinations, the popularity of antique finishes and effects that produce an aged appearance—these factors constitute only a few of the features which are responsible for the multitude of problems confronting the manufacturer of finished goods today.

Added refinements are continually being incorporated in practically every useful and ornamental article that is manufactured, and chief among these refinements is the color, style and durability of finish employed. Indeed color and finish—the coatings employed for protective and decorative effects—have reached a point of major importance. As a result information and service along these lines are very much in demand.

Manufacturers today are more inclined than ever to welcome the appearance of the independent "finish designer," "industrial colorist" or "color consultant"—which ever you prefer to call members of a profession which is as much entitled as lacquer finish, to be called "new" at this time.

In general, we may reasonably assume that the independent finish designer will carry on as does a furniture designer, a consulting engineer or an architect. His function will be to make a careful study of the product according to complete information supplied by the manufacturer and with the manufacturer's desired objective in mind, recommend one or more color or finish designs and designate how to obtain these finishes satisfactorily and economically within the cost allowance placed on the product.

Members of this profession, in business for themselves, will be absolutely independent of connection with any manufacturers of materials or equipment, and will not take it upon themselves to recommend brands but rather certain specifications which must be met by the materials, equipment and methods used.

Then, where the finish or color consultant's work ends, the efforts of sales and service departments of material and equipment manufacturers will begin and in all probability, proceed along a more intelligent, satisfactory and profitably-directed basis for all concerned.

Will Antique Return Oak

Manufacturers and dealers in oak lumber have long been living in hopeful anticipation that the trend in styles would return oak to more universal favor for fine furniture, cabinets and interior

finish. Many things, like styles, move in cycles.

Today, practically all the popular furniture finishes—walnut, mahogany and colors—are built up or treated to give the surfaces the appearance of having age.

The effects and appearances of true age and actual usage are obtained by skillful imitation through high lights, clouded, "smoked" or shaded areas, crackle finishes, etc. Numerous antique finishes are popular both in woodwork and ornamental ironwork.

Will not this trend eventually bring back into favor oak, which was once so popular for furniture and interior woodwork? Oak is a wood that lends itself admirably to a variety of finishes which may be given aged effects that appear at once convincing and attractive.

Judged by Performance

Much of the industrial advertising copy used today is "performance copy"—copy that tells what the product or article has done or is doing for some other firm. When any material or equipment gets the indorsement of a user—especially if the user is prominent or nationally known—and permission is granted to use this recommendation in advertising copy, the manufacturer generally considers he has obtained a real opportunity.

Indeed, any concern is to be congratulated on obtaining the indorsement of its products by satisfied customers. However, on the other hand, when a product fails to get such indorsement, or when its use is discontinued by certain concerns for some reason or other, is it fair to assume that such a product is really unsatisfactory? Not always.

All the facts must be considered in a test—the conditions under which the article is used, any special requirements to be met, the methods employed, the attitude of workmen, foreman and management; the service, if any, rendered by the manufacturer, and numerous other factors. Sometimes there is inadequate service or instruction accompanying the new material or equipment. Sometimes the new article going on trial faces the barriers of prejudice, jealousy, ignorance and carelessness—any one of which is very difficult to surmount, even with an expert service man on the job.

Experienced sales managers know well that one of the big initial tasks in getting a new article introduced and accepted in a finishing department is to "sell the foreman on it" and get his complete co-operation in giving it a fair trial. Well directed advance publicity in the trade journal the foreman reads helps to do this.

Report On Fire Hazards

At the thirteenth annual meeting of the National Fire Protection Association, to be held at Atlantic City, May 10-13, reports of the committee on manufacturing risks and special hazards in industrial finishing will be presented for discussion and adoption. The association has mailed out pamphlets containing advance publication of these reports which deal specifically with engineering standards and proposed regulations pertaining to dip tanks, paint spraying and spray booths.

It is generally agreed that the present regulations governing dip tanks, spray booths, foam extinguisher systems, etc. (Edition of 1922), while generally applicable

today, are in need of amendments which are presented in this report. The suggested changes in the rules for spray booths are necessary, it is pointed out, to make the rules conform with the best current practice. According to the report, "many serious fires have occurred indicating the need of these changes which, however, are not radical. The rules were originally compiled with the thought that ordinary paints and varnishes were the hazards to be covered. The introduction and extensive use of pyroxylin and other lacquers and the resulting experience indicates the need for changes.

"Last year the committee prepared a tentative advisory report on pyroxylin finishes to try out the practicability of certain suggestions, and as these have been found satisfactory it is proposed to write into the rules certain suggestions of the advisory pamphlet on pyroxylin finishes."

The purpose of the National Fire Protection Association is: "To promote the science and improve the methods of fire protection and prevention; to obtain and circulate information on these subjects and to secure the co-operation of its members in establishing proper safeguards against the loss of life and property by fire." Executive offices are at 40 Central St., Boston.

Floor Lacquers

Practically any clear lacquer, with the use of a proper reducer, can be applied one coat, on wooden floors, by brushing. This applies particularly to new floors.

If the old finish has been wax or varnish, lacquer is not a very good thing to use, because of the danger—in the first case, of the wax preventing the lacquer from sticking, and in the second case, because of the lacquer solvents softening the varnish.

There are now on the market special lacquers which are made for brushing. These can be applied over suitable grades of varnish that may have already been applied to the floor, or they can be used on new work by brushing.

The cost of such clear brushing lacquer is only a little higher than that of a good grade of varnish. The appearance is about the same as though the floor had been shellaced, but the durability is better than shellac because it is waterproof, harder and will not chip so easily as shellac.—O. P. C.

Many factories have burned down, and hundreds of men have been thrown out of employment all through the carelessness of some workman. Let us do what we can to prevent a repetition of these conflagrations and the suffering that follows in their wake.

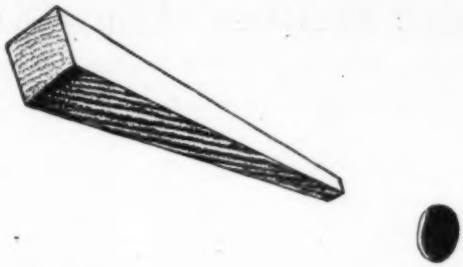
Pitting of the finish is generally due to excessive air pressure or insufficient removal of condensation of moisture in the air line. Heavy liquids require larger openings in the spray head as well as greater air pressure; thin liquids, vice versa.

Campbell Has Moved

The M. L. Campbell Co., manufacturer of varnish remover, has moved from 2334 Penn to 1000 West 8th St., Kansas City, Mo.

New De Vilbiss Catalog

The De Vilbiss Co., of Toledo, Ohio, are distributing to those interested their new 12-page catalog "B," in which complete spray finishing equipment for finishing, refinishing and touching up automobiles and accessory parts, is illustrated, described, conveniently grouped in outfits, and priced for buyers.



Is the finish you use a Square Peg in a Round Hole?

THE industrial field may choose from many excellent finishes. But a *good* finish is not enough. Ask yourself this question.

"Is the finish *scientifically adapted* to the job it will be called upon to do?"

The du Pont Industrial Finishing Service is offered to industries which demand that the adaptation of a finish be as scientifically planned as any other operation in the manufacture of their product.

Only in this way will the most economical, durable, and lasting finish be secured.

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E. I. du Pont de Nemours & Co., Inc., Chemical Products Division, Parlin, N. J., Chicago, Ill., San Francisco, Cal., Everett, Mass., or Flint Paint and Varnish, Limited, Toronto, Canada.

DU PONT

Period Finishes—Louis XIV

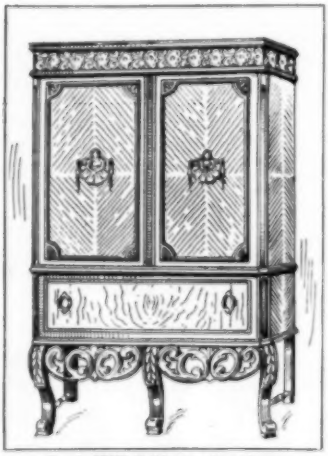
Revealing the time of its establishment, the chief characteristics of, and suitable modern finishes for the royal French style in furniture known as Louis XIV.

By R. J. Meade

THE RENAISSANCE period in French furniture making came to a close with the death in 1643 of Louis XIII, a crafty monarch more bent on political intrigue than on luxurious living. With the accession of Louis XIV, however, all this changed. Artistic dependence on Italy ceased for it was Louis' ambition to shine in the eyes of the world as the most magnificent and powerful monarch of all ages.

Characteristics

A royal manufactury of furniture, tapestry and interior decoration was established and those placed in charge were instructed to spare no expense in expressing the truly regal spirit. The royal love of glitter was answered with gilded soft woods, and elaborately carved walnut superseded the massive oak and chestnut pieces of the Renaissance. Later the intricate inlay of Boule was introduced with its elaborate floral and scroll designs worked out in tortoise-shell, ivory, porcelain and brass.



Louis XIV Cabinet—American Reproduction.

As a style, Louis XIV is rather too grandiose for extensive modern reproduction, being better suited to the vast halls of Versailles than the average American home even of the better class. European importations are walnut and quite pale in color. The wood appears to be filled with natural or very light filler, then shellaced and rubbed dull or waxed. The finish is subordinated to the carving and upholstery work.

Modern Finishes Applied

American reproductions are in the more expensive living room pieces or dining room suites. Walnut is given a very thin wash coat of shellac or lacquer and filled with light or medium walnut paste filler, then shellaced and finished with two coats pale rubbing varnish or three coats lacquer, rubbed dull. If desired a light water stain may be applied to the wood prior to the sealer coat—about 1 to 4-oz. of walnut crystals or aniline powder to the gallon of water. On living room pieces ornaments may be highlighted with pale gold bronze, or antiqued by sanding the stain on raised parts.

Curtis Style ZP Outfit comes ready for easy assembly.

Your Paint and Lacquer Gun Outfit Probably Has a Curtis Compressor

The principal manufacturers of Spray Gun Paint and Lacquer equipment have found Curtis compressors to be the best adapted and most satisfactory air supply. After exhaustive tests, they have learned that Curtis Air, due to its patented controlled splash lubrication, is free from excess oil vapor which ruins lacquer and paint finish. Profit by this experience and insist on a Curtis compressor with your paint and lacquer gun outfit—or add a Curtis to your present outfit.

Curtis Style VP Outfits are ready to operate as soon as motors are connected and motor and compressor lubricated.

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On mahogany, a reddish brown aniline stain of standard shade should first be applied, about 4 to 6-oz. of the powder to the gallon of hot water. This is sanded when dry and followed by red or brown paste wood filler, finished as specified for walnut.

To secure a handsome two tone effect, stain and fill the frames but apply filler only to the crotch or pencil stripe veneers. The filler should be put on over a sealer coat of thin shellac or heavily reduced lacquer, to keep the oil from darkening the tone of the wood.

Gold bronze and bronzing liquid are used chiefly on a type of soft-wood chairs turned out in quantity production for hotels, clubs and the like. A coat of body varnish or shellac usually precedes the gold bronze and occasionally pale lacquer is applied as a final protective coat as well. Some finishers apply the gold bronze on the varnish sealer coat by blowing on while the varnish is still tacky.

Lacquer for Floor Finish

Practical finisher recommends lacquer as a floor finish, and tells how to use it to produce satisfactory results.

By Edw. C. H. Rottmann

THERE is no branch of the painting or finishing trade that entails more drudgery than finishing floors, and for this reason the floors suffer as far as durability and beauty of finish is concerned. Often the flooring itself is not properly selected, but is left to the discretion of floor layers who as a rule are paid by the square, and do not give very close attention to color and sap wood. Experience has proven that a little bonus paid the floor layer generally brings about more satisfactory results insofar as proper selection of wood in laying is concerned.

Equalizing Wood Color.

It is a fact that frequently the equalizing, by the finisher, is not done until it is too late to do it successfully. Finishers should not overlook the necessity of toning or equalizing at the proper time. A great deal of grief is caused by leaving this important operation to take care of itself. This equalizing can be done after the filler coat is dry, with acid stain cut to the shade desired.

The present day demands are that floors be held as light as possible, and in my estimation a floor finished in lacquer has solved the problem. Lacquer not only gives a more beautiful, durable, and lighter finish than the old methods, but it holds down cost in labor.

Operations in Detail

Referring to the first operation, after the floor is sanded for finishing, it is given a size coat of high-grade pale wood lacquer. This requires no sanding and it can be filled within an hour after application. The filler should be made as short in oil as possible. This is easily cleaned off and it dries hard over night.

The filler coat is given a light sanding; the sap toning and equalizing must be done at this

Matthews Gun Applies a WETTER Coat

By producing a fine and thorough atomization, the new Type L Matthews Finisher's Gun applies a *Wetter* coat. This results in less sanding, less rubbing and polishing—and produces a better finished product at a lower cost.

The Type L Gun is a really fast gun. Finishers everywhere are turning to it as a means of reducing their costs. Try it and see for yourself. Write for descriptive bulletin on the new Type L Gun, telling us what kind of material you use and whether pressure or jar feed is preferred. We'll give you complete information—including prices.

W. N. Matthews Corporation manufactures a complete line of finishing equipment. Ask for your copy of the booklet "Mechanical Equipment for Product Finishing."

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MATTHEWS MECHANICAL PAINTING EQUIPMENT

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time, as above mentioned. After this, the floor is given a stout coat of wood lacquer. This will dry to a dull finish which is very attractive. If a polish or high luster is desired, the surface can be rubbed with oil and polishing powders.

Lacquer Advantages

The advantages gained by the use of this formula over the old method of floor finishing are numerous, but briefly the initial coat of lacquer holds the floor lighter by preventing the absorbtion of oil from the filler into the wood. A sample test can be easily made by filling a piece of flooring with this size coat, and one that has not been sized. The several shades difference in color will be convincing.

A high-grade pale wood lacquer is superior to shellac for floor finishing.

While no great difference in price of materials will be noted in these operations, yet, the cost will be no greater than it is in other methods. I am speaking from the point of beauty and durability of finish. This method eliminates many of the faults that are found with other methods in floor finishing, in that it is moisture proof, and does not chip, or scratch easily. A lacquered floor is not slippery. As for labor, each operation is produced with less effort than under the old system, and the result is a more beautiful floor of uniform appearance.

Based on Experience

In submitting this article, I am writing after considerable experience in finishing floors in residences and business buildings in shellac, wax, varnish and lacquer. I am convinced that the lacquered floor is a very durable finish from every standpoint. I have used it in my own home before brush lacquers were obtainable, and the severe tests I placed on it have secured my conviction.

Piano Staining and Filling

One of the approved systems of piano staining and filling is conceded to be as follows: A water stain which is allowed to dry about 24 hours; then a wash coat of shellac reduced at the rate of about 7 or 8 parts of denatured alcohol to one part of 4-lb. cut white shellac.

After the shellac coat has dried five hours, or in some instances over night, it is sanded to remove the fuzz and fibre from the wood, which have been raised by the water stain and stiffened by the wash coat of shellac.

Then a paste wood filler of the proper color is reduced with naphtha and applied by brushing. This is allowed to stand for 15 or 20 minutes to take a "set", and then rubbed off with burlap, hemp or tow, or in some cases with sea moss, across the grain of the wood, so as to leave the filler in the pores but to remove it entirely from the sections of the wood between the pores.

Such a filler has practically no staining action on the wood between the pores and the resulting finish shows the color of the stain on the solid parts of the wood and the color of the filler in the pores. This filler coat is usually given at least 48 hours to dry before succeeding coats are applied.—B. C. Farrow.

The air hose at spray booths, like any other rubber product, is susceptible to disintegration if allowed to come in contact with oil. The air-supply line should always be turned off when the spray gun is not in use, to relieve unnecessary strain on the air hose.

Here's an airbrush you designed—

YOU—who have operated airbrushes, have been demanding improvements—here they are.

Here's the new Paasche Multiplehead. It answers your questions.

An even spray? Accurate control? Yes, both are positively attained from round to fan shape in this new design.

Constant use? That's taken care of by supplying a spare head, to be used while the other is being cleaned.

Easy cleaning? Unscrew the head, and wipe the exposed parts with a cloth.

Greater capacity? The heads come in various sizes. You have several sizes of airbrushes at little more than the cost of one.

That's the airbrush you helped design. Order one on trial. Use it. You won't have to keep it unless you agree it's the finest airbrush ever made.

Paasche Airbrush Co.

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Takes the Rub out of Rubbing

1600 hand strokes a minute—that's what the Paasche pneumatic rubbing machine will do. It not only relieves fatigue, but it also makes smoother finishes possible. For sanding or rubbing between finishing coats, it is exceptionally fine.

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Articles to be finished.....
Material to be applied.....
How many airbrushes do you now use?.....
.....
What size compressor have you?.....

IF b-Gray

Questions and Answers

This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers.

To Kill Red in Walnut

We have experienced some trouble in eliminating reddish patches that sometimes occur in walnut veneer. We have tried to bleach it with oxalic acid but without success. How do others overcome it?—M. & S. F. Co.

Why Lacquer Peels

We have been using lacquer finish, and have been having quite a lot of trouble with this lacquer peeling off around the mouldings, in some cases 24 to 48 hours after the job is finished. The lacquer flakes for about ¼-in. What is causing this trouble?—D. A. P. S.

Imitation Marble Finish

If possible, we wish that you would give us all the data you have at your command regarding the finishing of wood parts in imitation marble. I have noticed a great many window display fixtures in stores around the various cities that have this type of finish on them, and we are desirous of putting out something similar.—S. D. C. Co.

Iron Finished Antique

We have a customer who wants ornamental iron work finished so it has an old antique appearance—aged and semi-rusty. The concern has samples called "Italian Finish," from New York City. The finish does carry out this plan and is artistic; it has a bit of color to liven it up, but the colors are subdued—no shine. This customer sells quite a lot of this work.

We have done very little for them as we never could get this effect; the iron part we can do; the finish, we want to know how to get.

Have you seen what they call "Italian antique"? We do lacquering, polishing and such work, brush finish. A lacquer company suggested a plan to use their lacquer—painted finish—that would never do. It isn't a painted finish, as the iron and grain of iron shows through.—B. M. S.

Finishing Pedestals Cheaply

We are manufacturing a line of mahogany finished pedestals, using basswood lumber. This line is sold at the lower, popular prices, and naturally we must have production. We, of course, finish each of the three parts separately, that is, the post, the top, and the base.

We first dip in stain, letting dry over night. We then brush on, in the lathe, a coat of substitute shellac, letting this dry over night. Then we brush on another coat of substitute shellac, and the next day we sand; the following day we brush on a coat of rubbing varnish, and on the last day we polish.

We are going to eliminate the last operation of polishing by using a flat varnish. Can the

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THE MINER EDGAR CO.
110 William St. - - New York, N. Y.

various coats of substitute shellac and the varnish be dipped instead of brushed on in the lathe, as this is an expensive operation?—B. B. Co.

Dipped Lacquer Bubbles

We are dipping by machine, in lacquers, small wood turnings, 2½x1½-in., in various bright colors, requiring three and four coats to secure the proper finish with a 20 percent reduction by means of the reducer furnished by the lacquer manufacturer.

We are unable to prevent bubbles which appear after the third or fourth coats have been applied and during the process of drying, usually when the piece has been on the drying rack for 20 to 30 minutes. These bubbles are filled with air and, on being pricked, cause ridges and uneven surfaces. Can you give us any information? —P. S. M. Co.

To Kill Oak Flake

Where I am employed we have a lot of oak office furniture to be stripped and refinished as mahogany, with lacquer. What I would be glad to know is of some way to camouflage the flake in the oak. At present, some pieces have been done by just staining with a red water stain and mahogany filler, two coats wood sealer, and lacquered.—A. R.

It is not easy to hide or camouflage the characteristic flake in oak without considerable trouble. About the only way to do this, so that it is entirely camouflaged, is to first fill the wood so that the pores are flush with the surrounding surface after the old finish has been removed, using any shade of paste wood filler that may be available for this purpose.

After this coat of filler has dried about 15 or 20 minutes, it should be rubbed off across the grain of the wood so that the filler is left only in the pores. Then it should be allowed to dry at least 24 hours, or preferably 48 hours. Following this, put on a coat of lacquer or paint material of the proper shade to act as a ground color for the shade of mahogany which you desire to obtain.

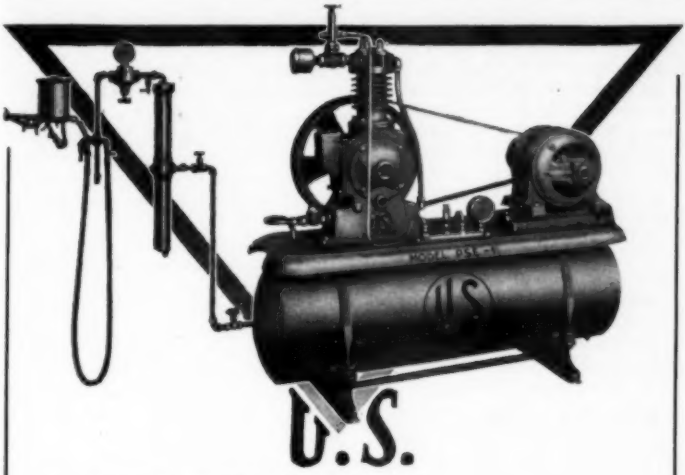
For ordinary red mahogany, this would be of a redish orange tone, and for the darker brown mahogany, it will be of a redish brown color. Let this coat dry, then imitate the grain of mahogany with oil colors thinned down with turpentine and grained out by hand with graining tools, or with the aid of a graining composition roller.

After this graining coat has dried thoroughly, you can then apply as many coats of the clear lacquer as you desire, and then rub or polish the work.—I. F.

Dipping and Drying

We do a considerable amount of finishing by using the method of spraying and of dipping, and as we are about to remodel our present building for this purpose for larger quarters, we would like to secure any information that we can along the lines of methods used by other concerns for this particular work.

We are interested in ventilation, dryers, various methods of pinning turnings for dipping and various methods of handling such turnings, or anything that you believe might be of service to us when we are making this change. —N. & T. M. Co.



A Real Paint Job Requires Perfect Equipment

It has been proved that, to do perfect paint spraying, *a pressure of at least* 5 to 6 cubic feet of free air per minute is required. With U. S. Paint Spray units you get clean, dry air at the rate of 7 or 16 cubic feet per minute for 1 or 2 gun continuous operation. This powerful continuous pressure is created by the U. S. Air Compressor behind the gun. Fractional horsepower units, delivering only 2 to 3 cubic feet of air per minute *cannot* do the work.

U. S. Paint Spray Equipment P. S. E. I. (shown above) consists of 3" x3½" air-cooled, single cylinder, compressor; prestretched, high quality leather belt; 1½ horsepower, popular make motor installed on special U. S. Auomatic, self-adjusting, spring tension motor base; 30-gallon tank, moisture separator and Model "N" gun with hose and fittings.

The P. S. E. 21 is a larger size of the same design with 3-horsepower motor and 60-gallon tank. It has all the refinements of the smaller unit but is built for greater air service requirements.

Write for our Paint Spraying Bulletin just off the press giving complete details about U. S. equipments.

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Lacquering Steel

In regard to an inquiry in March issue, if A. F. S. M. cannot successfully use the method suggested by I. F., in that same issue, let him try dipping his steel parts in a 10 per cent solution of muriatic acid, then rinse in clear hot water, wipe off and prime at once, using an oil-base oxide primer with a low pigment content.

Best results will be obtained by putting a coat of red oxide surfacing material over the primer; if this is done the lacquer will stick.—I. J. F.

Mule Hide Floor Finish

Referring to the question asked by J. D. in March issue, wash the "Mule Hide" material with a fairly strong solution of good washing powder. Let it dry and then, put on two coats of shellac (either orange or white) and varnish with most any kind of a good floor or spar varnish.

Lacquer, as it is produced today, will not work satisfactorily on "Mule Hide" roofing which is used for floor covering.—I. F. J.

Preparing Aluminum Castings

Regarding the inquiry of A. C. Co. in March issue, for a good many years my method of cleaning aluminum castings has been to immerse them in a 20 per cent solution of acetic acid until all oil and grease is removed or neutralized. Then rinse in a vat of clear hot water and allow castings to drain and dry. Do not wipe them. Spray or brush as soon as the moisture has disappeared.

Eliminate all oil on the surface and use materials especially formulated for aluminum and your troubles in this line will disappear.—I. F. J.

Referring to the above, we have spent considerable time with various cleaning compounds that would clean this kind of casting, and have finally adopted the following method as the most satisfactory.

Dip the castings for a few seconds into a boiling solution of tri-sodium phosphate and water (about 8-oz. to the gallon). Rinse immediately in clean boiling water. No time must be lost in transferring the pieces from the cleaner to the clean boiling water. They should be coated as soon as possible after cooling, so that the metal will not oxidize again. The length of time that the castings are left in the cleaning chemical has a great deal to do with the final finish. Too great a time will cause the finish to lose its luster in a short time, while too short a time will, of course, not permit a thorough cleaning.

It is probably unnecessary to add that a special type of enamel or paint must be used as a first coat on aluminum.—Edward G. Burgess.

Those Chemical Cleaners

We note with great interest a very comprehensive analysis written by R. L. Masterson in the April issue on the subject of "Chemical Cleaners." We are, as you probably know, manufacturers of "Deoxidine," the cleaner which we assume is the cleaner referred to, for it is the phosphoric alcohol cleaner. From our great experience in this cleaning problem we have a suggestion to make to Mr. Masterson that may interest him, namely, that the

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sulphuric acid cleaners are all rust producers.

This fact is very easily demonstrated by brushing on a piece of auto body stock, a stripe of the various cleaners and observing, after the lapse of several months, the amount of rust produced by each of them. Another very quick test is to insert a nail in a test tube containing these various cleaners, leaving the test tube uncorked and observe the amount of rust formed in each case. These simple tests prove very conclusively which cleaners are rust producers, and which are not.

Our experience in these cleaning problems is at the disposal of your readers and the industry at large, and should we be able to assist you in any of these problems we will gladly do so.

This article by Mr. Masterson brings out the details of the cleaning process so well that we would like to secure a dozen additional copies of this April issue, which we would request that you forward us, billing us at the regular price.—American Chemical Paint Co.

Elimination of Bending Stains

Stains in wood due to bending it in iron or steel forms, present a real problem to many concerns who use bent wood that later must be finished

By Norvel Thayer

IT IS quite generally conceded that the staining of wood from steam bending forms, is due to a chemical reaction which takes place between small traces of iron compounds—probably sulphate of iron—on the bending forms, and tannic acid or other acids of a similar nature in the wood.

In everyday practice a process somewhat similar to this, that is, the combination of sulphate of iron and tannic acid, is employed in making ink. This staining seems to occur most generally with the use of new forms, and usually grows less after the forms have been used for a considerable time.

Bending Iron Treatment

Some workmen make a practice of preparing their bending irons for use by soaking them first in a hot 10 per cent solution of caustic soda, until all of the grease is removed. Then they wash the irons with boiling hot water to remove the caustic solution and then soak them in hot 10 per cent sulphuric acid solution until all traces of discoloration are removed from the iron and the bright surface of the iron is exposed.

The iron should then be thoroughly washed off with boiling water again and soaked in a 10 per cent solution of carbonate of soda, which is a mild alkali material, to counteract any traces of acid which might be left, and thus prevent rusting.

After being removed from the carbonate of soda solution the iron should be washed in hot water and then, if at all practical, dried in an oven to thoroughly remove all traces of moisture. This leaves a chemically

pure metallic iron surface to go next to the wood, and there should be no further trouble with staining.

Use of Lacquer

Where staining has taken place it is usually not very deep and is more or less a surface condition on the wood. After the irons have been absolutely cleaned by some system such as the above, it might help to dip them in a clear lacquer to prevent oxygen in the air from again rusting the wood. Although this lacquer coat will last for some time it will eventually wear away, due to friction between the wood and the irons and also due to the continued intimate contact with the hot, moist wood. Nitro-cellulose lacquer of the proper type, however, will withstand this hot, moist wood and the abrasion longer than any other type of coating material.

Bleaching the Stain

Where the staining is not very deep it may be entirely removed by the planing, shaping-off and sanding operations in the ordinary shop routine. However, where the stain is too deep to be taken off in the regular course of preparation for finishing, it is necessary to use a bleaching agent of some sort.

A saturate solution of oxalic acid is sometimes used, but care

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must be taken not to apply shellac directly next to the wood after this bleaching agent has been applied, because there is sometimes a tendency for the shellac and small traces of oxalic acid left on the wood to react with each other to form a pink color.

Where a staining and filling operation is used it is not so necessary to take this precaution, because the stain and filler will prevent the shellac from reacting with any small quantity of oxalic acid left on the wood.

To make the bleaching operation as safe as possible, the work should be well sponged with warm water after the oxalic acid has done its work, so as to remove as much of it as possible. Where one application of oxalic acid does not remove the stain, sometimes a second or third application will take it off.

It has been found by some individuals that a 10 per cent solution of hypo-chloride of lime and 90 per cent of water by weight works just as well as oxalic acid, as a bleaching agent and is less expensive.

Making Shellac-Stain

One of the difficulties encountered in finishing wood with a water stain is the raising of the grain. To prevent this, make a combination stain and shellac. One way to make this shellac-stain is to first prepare two separate mixtures, the first mixture a double-strength stain.

Suppose the depth of color desired requires a stain made in the proportion of 3-oz. of stain powder to one gallon of water. We make the stain in the proportion of 6-oz. of stain powder to a gallon of water. For this purpose stains soluble in water

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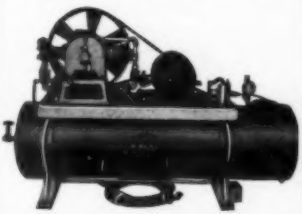

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Guns that atomize at the end of the spray operate too far from the surface—evaporation takes place, material does not lay smoothly and hand-rubbing is in order. Take every advantage of economy afforded by spray finishing. You can find no greater satisfaction than in the use of the Binks Spray Gun. We will gladly mail you further details upon request. Write today.

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only must be used. There are stains on the market that are soluble in both water and spirits, but for reasons which are not pertinent to the question under consideration, these will not prove successful. In making double-strength stain the water should be heated to about 175-degs. F. Do not use it at the boiling point.

Solution No. 2 is made by dissolving one ounce and 60 grains of dried carbonate of soda in one gallon of water, and adding ½-lb. of bone-dry bleached shellac gum. Heat the water to 150-degs.F. and, after the carbonate of soda is dissolved, pour in the shellac gum and stir.

In making this second solution, two things must be carefully attended to. One must be sure to have the right kind of soda. Today I asked a high school student in chemistry, "what is carbonate of soda?" He said, "baking soda." That is not correct. Baking soda is bicarbonate of soda.

Some drug stores have been known to give baking soda when asked for carbonate of soda. Others again think it is sal-soda, or washing soda. As a rule druggists know very little about finishing, and unless the customer knows exactly what he wants, he may not get it. The best place to obtain this chemical is from a wood-finishing supply house. Order dried carbonate of soda, tell them what you want it for, and you will get the right thing.

The second thing to be careful about, is the kind of shellac used. It must be fresh and dry. I have had bleached shellac which was insoluble in pure alcohol. This shellac was old, and had been affected by dampness. I have discussed this matter with manu-

facturers of bleached shellac, and am told that shellac from which the bleaching chemical has not been thoroughly washed, is apt to become insoluble in time. It can be reclaimed, but I doubt if it is ever very good again. Lumpy shellac is often an indication of insolubility.

A finisher must be very careful to use the correct proportions of shellac and carbonate of soda. Otherwise the effect may be disastrous to the stain. It is the carbonate of soda that causes the shellac to dissolve in water. This chemical would be harmful to stain, if put in by itself; but if it has first dissolved as much shellac as possible, it is rendered harmless. Too great a proportion of carbonate of soda causes the stain to separate from the water, and settle. Too much shellac is not so disastrous, because sufficient shellac would be "eaten up" by the chemical to neutralize the latter. The remainder of the shellac may be removed by straining.

Having mixed solution No. 2, stir it continually, or at frequent intervals, until the shellac is all dissolved. Then pour the two mixtures together. Now you see the reason for first making a double-strength stain; the addition of the second mixture reduces it to its proper strength.

This stain will not raise the grain of wood. Rightly understood, and properly used, it will save a great deal of time and labor in finishing.—K. L. J.

Kauri gum is a fossilized gum dug from shallow depths where kauri forests are buried by volcanic action in comparatively recent geological periods, and is peculiar to the peninsula to the north of Auckland, New Zealand.

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Use the Spray

During recent years spray equipment has been so improved that it is now very simple to operate. Almost anyone who is willing to learn can make a success of it.

Some concerns who tried the spray shortly after it first appeared on the market, and who failed with it largely because they didn't get the proper co-operation of the finishing staff, have either returned to its use or are preparing to do so.

Spray operators do more and better work in good light.

Finishers who formerly were opposed to the spray system are now marching in the line of progress; it is absolutely necessary that they do so. The factory executive or finisher who is satisfied to continue in the ways of yesterday will soon be left far behind.

One of the big things in favor of the spray system is that it has made possible the use of modern lacquers for industrial purposes. Lacquer finishes and the spray system are here to stay; these represent two of the greatest ad-

vances recently made along finishing lines.

One of the main things to look out for, when using the spray system, is to keep the air-line free from moisture. During periods of unusual humidity there is some possibility of the condenser becoming overloaded if it is not emptied at frequent intervals.

When little white specks show in sprayed shellac after it is dry, you have a pretty sure sign that the condenser is not functioning properly, either because it is being overworked, or it is not being emptied often enough. These white specks may be caused by small drops of water being carried along the air line and getting into the shellac. A number of finishers have had trouble in this respect during summer months.

The fact that this trouble occurs is no fault of the machine, as provision has been made for its prevention. In real damp weather I have found it a good plan to relieve the air of its moisture, or as much moisture as possible, before it enters the compressor. This can be done by having cold water pipes in the room from which the air is drawn, or by drawing the air through a cabinet filled with cold pipes before it enters the compressor. As soon as the air comes in contact with these pipes its temperature drops, and the moisture it carries condenses and separates from the air. Of course, provision must be made for carrying this water away after it leaves the air.

There is a possibility, under certain conditions, of cooling the air too much for use in the air-line, but the possibility is very slight because compression causes

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the temperature of the air to rise. However, if the air appears too cold the dehydrated air-line can be passed through an electrically heated cabinet.

Moisture in the air-line not only causes specks in shellac, but it causes pitting of varnish and lacquers; it will cause white specks in the cheaper varnishes. The pits are places that were filled with small drops of water which subsequently evaporated.

If there is a finishing room in which for any reason the spray outfit has been either discarded or has not yet been tried out, I would say that if they hope to stay in business, in competition with modern practices, they cannot do so by antiquated methods. Finishing room methods have made such wonderful strides within the past few years that only those who are wide awake, are keeping up with their competitors.—C. M. Raymond.

The airbrush offers a free steady flow of materials of any consistency and color, with complete control by the painter or operator.

New du Pont President

The directors of E. I. du Pont de Nemours & Co. on March 15 elected Lammot du Pont as president of the company to succeed Irenee du Pont, who desired to be released from the duties of the office so that he might devote more of his time to personal affairs.

The retiring president was made vice-chairman of the Board of Directors and Chairman of the Finance Committee. He retired from the Executive Committee and the new president was made its Chairman.

Mr. du Pont has been importantly identified, as director or officer, with the affairs of the parent company's subsidiaries and affiliated companies, and he is a director and member of the Finance Committee of the General Motors Corporation in which the du Pont Company has a large interest.